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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,130	01/02/2002	Fred A. Bower III	BEA920010035US1	8792

23441 7590 05/04/2005

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EXAMINER

BULLOCK JR, LEWIS ALEXANDER

ART UNIT	PAPER NUMBER
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2195

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,130

Applicant(s)

BOWER, FRED A.

Examiner

Lewis A. Bullock, Jr.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application-No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because of Draftperson's Review. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, 4, 6, and 7 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The cited claims detail a method, i.e. software instructions, for determining if processes are properly functioning. There is no statutory or tangible structure/operation that complies with 35 U.S.C. 101. The examiner refers to M.P.E.P. 2106 in explaining that software or abstract ideas are not in compliance with 35 U.S.C. 101 without any tangible structure/operation.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4-6, 8, 9, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by "Common Software Model Deployment Initiative System Design Document, Version 1.0" by SOUTHWEST Research Institute.

As to claim 1, SOUTHWEST teaches a method comprising: sending a signal (heartbeat) from a worker process (other subsystem processes / subsystem data server interface / subsystem process control / subsystem status logger) to an executive process (subsystem heartbeat management / heartbeat process) (pg. 29, "Each process within the subsystem sends a heartbeat message to this process."); receiving the signal (heartbeat) by the executive process (heartbeat process) (via process calling receive process heartbeat function) (pg. 34); determining by the executive process (heartbeat process) whether the worker process is improperly functioning (via the received heartbeat); and in response to determining that the worker process is improperly functioning, terminating the worker process by the executive process (via a Process Termination call) (see figure 17, pg. 30 and 31).

As to claim 4, SOUTHWEST teaches sending the signal from the worker process to the executive process comprises calling an application program interface, API, of the executive process by the worker process (functions / library) (pg. 29, section 3.2.2).

As to claim 5, SOUTHWEST teaches otherwise, incrementing a hardware heartbeat counter (timer) by the executive process for the worker process (pg. 29, "The heartbeat process updates the process status and the last update time each time a heartbeat message is received from a process.").

As to claim 6, SOUTHWEST teaches determining by the executive process whether the worker process is improperly functioning comprises determining by the executive process whether the worker process is malfunctioning (via the process is incapable of sending heartbeats / based on the status information sent with the heartbeat) (pg. 29, "Each process within the subsystem sends a heartbeat message to this process.").

As to claim 8, SOUTHWEST teaches a system comprising: an executive process (subsystem heartbeat management / heartbeat process) (pg. 29, "Each process within the subsystem sends a heartbeat message to this process.") having a heartbeat interface (functions / library) (pg. 29, section 3.2.2); and a worker process (other subsystem processes / subsystem data server interface / subsystem process control / subsystem status logger) periodically calling the heartbeat interface of the executive process for the executive process to determine whether the worker process is improperly functioning (via process calling receive process heartbeat function to send and receive a heartbeat message) (pg. 34).

As to claim 9, SOUTHWEST teaches an operating environment in which the executive process (heartbeat process) and the worker process (other processes) operate, the operating environment having a hardware heartbeat counter (timer) incremented by the executive process (pg. 29, "The heartbeat process updates the process status and the last update time each time a heartbeat message is received from a process.") in response to calls to the heartbeat interface (function sending a heartbeat) of the executive process (pg. 33, "Fire Periodic Heartbeat Timer").

As to claim 14, SOUTHWEST teaches the executive process terminates the worker process upon determining that the worker process is improperly functioning (via the Process Termination function based on the status of the heartbeat) (pg. 29-31).

As to claim 15, SOUTHWEST teaches the heartbeat interface comprises a heartbeat application programming interface (functions / library) (pg. 29, section 3.2.2).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 3, 7, 12, 13, 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Common Software Model Deployment Initiative System Design

Document, Version 1.0" by SOUTHWEST Research Institute in view of FUCHS (U.S. Patent 5,440,726).

As to claims 16 and 20, SOUTHWEST teaches means (common software consisting of computer processes and code libraries) (pg. 1-2) for receiving a call to a heartbeat interface (functions / library) from a process (other subsystem processes / subsystem data server interface / subsystem process control / subsystem status logger) (via process calling receive process heartbeat function) (pg. 34) such that a process is terminated in response to determining that the process is improperly functioning (via the heartbeat process sending a process terminate function based on process heartbeats received) (see figure 17, pg. 30 and 31), or indicating that a process is properly functioning (most sever process status) (pg. 30). However, SOUTHWEST does not teach that the code is stored on a computer readable medium of an article or the changing of processor control between processes. Official Notice is taken in that it is well known in the art that software code is stored on a computer-readable medium of an article. However, SOUTHWEST does not teach process and the requesting process executing on single processor such that processor control is switched when one communicates with the other.

FUCHS teaches a fault tolerant system wherein there exists one node having a single processing unit (col. 5, lines 52-56) executing a plurality of processes by implementing a time sharing mechanism wherein one process, i.e. a watchdog process, monitors other processes via a passive monitoring arrangement wherein each process sends a heartbeat message at specified intervals to the watchdog which determines

whether the process is hung or has crashed (col. 7, lines 32-60). It would be obvious to one skilled in the art that since the processes time share the processor is multitasking. It is well known to one skilled in the art at the time of the invention that execution of one process that requests the execution of another process would switch the control of the processor to the requested process. Therefore, it would be obvious to one skilled in the art at the time of the invention to combine the teachings of SOUTHWEST with the teachings of FUCHS in order to detect faults in an application process and initiate recovery of that fault (col. 2, lines 37-55).

As to claims 2 and 3, However, SOUTHWEST does not teach the worker process and the executive process executing on single processor such that processor control is switched when one communicates with the other.

FUCHS teaches a fault tolerant system wherein there exists one node having a single processing unit (col. 5, lines 52-56) executing a plurality of processes by implementing a time sharing mechanism wherein one process, i.e. a watchdog process, monitors other processes via a passive monitoring arrangement wherein each process sends a heartbeat message at specified intervals to the watchdog which determines whether the process is hung or has crashed (col. 7, lines 32-60). It would be obvious to one skilled in the art that since the processes time share the processor is multitasking. It is well known to one skilled in the art at the time of the invention that execution of one process that requests the execution of another process would switch the control of the processor to the requested process. Therefore, it would be obvious to one skilled in the

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art at the time of the invention to combine the teachings of SOUTHWEST with the teachings of FUCHS in order to detect faults in an application process and initiate recovery of that fault (col. 2, lines 37-55).

As to claim 7, SOUTHWEST teaches determining by the executive process whether the worker process is improperly functioning comprises determining by the executive process whether the worker process is malfunctioning. However, SOUTHWEST does not teach whether the process is malicious.

FUCHS teaches a fault tolerant system wherein there exists one node having a single processing unit (col. 5, lines 52-56) executing a plurality of processes by implementing a time sharing mechanism wherein one process, i.e. a watchdog process, monitors other processes via a passive monitoring arrangement wherein each process sends a heartbeat message at specified intervals to the watchdog which determines whether the process is hung, i.e. malicious, or has crashed (col. 7, lines 32-60). It would be obvious to one skilled in the art that since the processes time share the processor is multitasking. It is well known to one skilled in the art at the time of the invention that execution of one process that requests the execution of another process would switch the control of the processor to the requested process. Therefore, it would be obvious to one skilled in the art at the time of the invention to combine the teachings of SOUTHWEST with the teachings of FUCHS in order to detect faults in an application process and initiate recovery of that fault (col. 2, lines 37-55).

As to claim 12, SOUTHWEST teaches calling of the heartbeat interface of the executive process by the worker process (via sending a heartbeat message) (pg. 29). However, SOUTHWEST does not teach the worker process and the executive process executing on single processor such that processor control is switched when one communicates with the other.

FUCHS teaches a fault tolerant system wherein there exists one node having a single processing unit (col. 5, lines 52-56) executing a plurality of processes by implementing a time sharing mechanism wherein one process, i.e. a watchdog process, monitors other processes via a passive monitoring arrangement wherein each process sends a heartbeat message at specified intervals to the watchdog which determines whether the process is hung or has crashed (col. 7, lines 32-60). It would be obvious to one skilled in the art that since the processes time share the processor is multitasking. It is well known to one skilled in the art at the time of the invention that execution of one process that requests the execution of another process would switch the control of the processor to the requested process. Therefore, it would be obvious to one skilled in the art at the time of the invention to combine the teachings of SOUTHWEST with the teachings of FUCHS in order to detect faults in an application process and initiate recovery of that fault (col. 2, lines 37-55).

As to claim 13, SOUTHWEST teaches an operating environment (system) having a hardware heartbeat counter (timer), the executive process (heartbeat process) and the worker process (other processes etc.) operating in the environment the worker

process calling the heartbeat interface of the executive process (via sending a heartbeat message) (pg. 29), and the executive process terminating the worker process in determining that the worker process is improperly functioning (via the Process Termination function based on the status of the heartbeat) (pg. 29-31). However, SOUTHWEST does not teach the worker process and the executive process executing on single processor such that processor control is switched when one communicates with the other.

FUCHS teaches a fault tolerant system wherein there exists one node having a single processing unit (col. 5, lines 52-56) executing a plurality of processes by implementing a time sharing mechanism wherein one process, i.e. a watchdog process, monitors other processes via a passive monitoring arrangement wherein each process sends a heartbeat message at specified intervals to the watchdog which determines whether the process is hung or has crashed (col. 7, lines 32-60). It would be obvious to one skilled in the art that since the processes time share the processor is multitasking. It is well known to one skilled in the art at the time of the invention that execution of one process that requests the execution of another process would switch the control of the processor to the requested process. Therefore, it would be obvious to one skilled in the art at the time of the invention to combine the teachings of SOUTHWEST with the teachings of FUCHS in order to detect faults in an application process and initiate recovery of that fault (col. 2, lines 37-55).

As to claim 17, SOUTHWEST teaches the executive process incrementing a hardware heartbeat counter (timer) (pg. 29, "The heartbeat process updates the process status and the last update time each time a heartbeat message is received from a process."). However, SOUTHWEST does not teach the worker process and the executive process executing on single processor such that processor control is switched when one communicates with the other.

FUCHS teaches a fault tolerant system wherein there exists one node having a single processing unit (col. 5, lines 52-56) executing a plurality of processes by implementing a time sharing mechanism wherein one process, i.e. a watchdog process, monitors other processes via a passive monitoring arrangement wherein each process sends a heartbeat message at specified intervals to the watchdog which determines whether the process is hung or has crashed (col. 7, lines 32-60). It would be obvious to one skilled in the art that since the processes time share the processor is multitasking. It is well known to one skilled in the art at the time of the invention that execution of one process that requests the execution of another process would switch the control of the processor to the requested process. Therefore, it would be obvious to one skilled in the art at the time of the invention to combine the teachings of SOUTHWEST with the teachings of FUCHS in order to detect faults in an application process and initiate recovery of that fault (col. 2, lines 37-55).

As to claim 18, SOUTHWEST teaches determining by the executive process whether the worker process is improperly functioning comprises determining by the

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executive process whether the worker process is malfunctioning (via the process is incapable of sending heartbeats / based on the status information sent with the heartbeat) (pg. 29, "Each process within the subsystem sends a heartbeat message to this process.").

As to claim 19, SOUTHWEST teaches determining by the executive process whether the worker process is improperly functioning comprises determining by the executive process whether the worker process is malfunctioning. However, SOUTHWEST does not teach whether the process is malicious.

FUCHS teaches a fault tolerant system wherein there exists one node having a single processing unit (col. 5, lines 52-56) executing a plurality of processes by implementing a time sharing mechanism wherein one process, i.e. a watchdog process, monitors other processes via a passive monitoring arrangement wherein each process sends a heartbeat message at specified intervals to the watchdog which determines whether the process is hung, i.e. malicious, or has crashed (col. 7, lines 32-60). It would be obvious to one skilled in the art that since the processes time share the processor is multitasking. It is well known to one skilled in the art at the time of the invention that execution of one process that requests the execution of another process would switch the control of the processor to the requested process. Therefore, it would be obvious to one skilled in the art at the time of the invention to combine the teachings of SOUTHWEST with the teachings of FUCHS in order to detect faults in an application process and initiate recovery of that fault (col. 2, lines 37-55).

7. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Common Software Model Deployment Initiative System Design Document, Version 1.0" by SOUTHWEST Research Institute in view of FUCHS (U.S. Patent 5,440,726) in view of Applicant's Admitted Prior Art (APA).

As to claim 10, SOUTHWEST teaches the processes execute on a system. However, SOUTHWEST does not teach the system has firmware (pg. 1, paragraph 6). APA teaches that modern computer systems typically have firmware. Therefore, it would be obvious to one skilled in the art at the time of the invention that the monitoring system of SOUTHWEST may persist on the system when it loses electrical power (pg. 1, paragraph 1).

As to claim 11, SOUTHWEST teaches the worker process comprises a diagnostic test process (other processes / system process control / subsystem status logger / subsystem data server interface) (pg. 30 and 31).

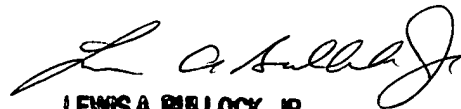
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lewis A. Bullock, Jr. whose telephone number is (571) 272-3759. The examiner can normally be reached on Monday-Friday, 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 28, 2005


LEWIS A. BULLOCK, JR.
PRIMARY EXAMINER